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Facts and the Use We Make of Them.

[Read before the Southern Division of the Cooper Ornithological Club.]

Mr. President and Gentlemen:

For a month past—since work slacked up a little and I have had time to think of anything but skinning birds and “spoiling them by setting them up on wires,” as Joe Grinnell puts it—I have been haunted by a phantom of a duty unperformed. I have felt that, in return for the privilege of belonging to this genial Club, I ought to at least *try* to do something, as others of you have done, to brighten our meetings after the disposal of routine business.

Giving to this the name “duty” recalls what Spencer says (*Prin. of Ethics*, No. 46, pp. 127, et seq.) as to the disappearance of the feeling of obligation (duty) when the *moral* motive has reached its complete development. “The truly honest man, here and there to be found,” he says—naively recognizing the fact that we are not all of us truly honest—“The truly honest man, when he discharges an equitable claim on him, is without thought of self-compulsion. He does the right thing with a simple feeling of satisfaction in doing it.”

Now, while I do not wish to pose as more honest than my fellow men, I *do* wish you to believe that the fulfillment of this that I have, for convenience, called a duty, gives me “a simple feeling of satisfaction.” To me it would be an unmixed pleasure were it not for the fear that it may not be a pleasure to you—that I may, in plain words, bore you and vex you.

At the risk, however, of “getting myself disliked” I feel impelled to offer you my views on the kind of work we should do, believing that we are not doing our best. I may be entirely wrong, and it is merely for the purpose of opening up the discussion of a question of paramount importance, that I do what a more politic, but not more sincere, friend might shirk. I am going to rub some of you the wrong way.

I cannot give you the kind of talk you are used to on the collecting of eggs, nor on the results of an expert ornithologist's observations of bird life. I have, of course, in my forty odd years of close association with our relatives of the woods, the prairies, the mountains and the lakes, noted habits and idiosyncrasies very interesting and very instructive; but I am sure all of you have seen or read of the same things, and I could not put the old material in a new dress that would lend it a fresh interest.

When I was a young man I had the good fortune to be, for some years, on terms of the closest intimacy with a very thorough student

of nature, a man of really unusual brain, combining a keen, calm, cold, almost cruel reasoning power with the poetical temperament, the vivid imagination, lacking which the scientist is but a one-sided creature. It is this power of imagination—under perfect control, of course, and nourished by a generous diet of solid fact—that made possible the brilliant results of Darwin's patient and infinitely painstaking investigations.

I was very raw in those days—had the most absurdly crude ideas of Nature's methods. I was somewhat cocky, too—pertly pig-headed—and I did not then appreciate my friend's gentleness and patience in pointing out to me the absurdities I had naturally and inevitably imbibed from the teachings of parents, pastors and masters, and in setting my feet in the only path that can lead us to the truth. I owe it to this clear-headed gentle-natured philosopher that I have not frittered away my life in the aimless acquisition of a mass of disconnected facts, but have devoted my time to the arranging and classifying of the facts that came under my observation in such manner that they would help to a fuller and clearer conception of how things have come to be what they are—would help in tracing the path evolution has followed in this particular field we are studying—would assist in comparing this phase of evolution with the course of evolution in general; for it is only by generalization that we reach knowledge worth attaining. This thing of collecting facts, labeling them and poking them away into some out-of-the-way pigeonhole of our brain, is a waste of time and energy. Complete knowledge is what we should seek. “The most complete knowledge,” says Spencer again, “is that knowledge of the highest degree of generality. We may know things more completely than they are known through simple experiences, mechanically accumulated in memory or heaped up in cyclopædias. We must make, first, generalizations of a simple or low order, and rise gradually to higher and more extended generalizations. The most highly generalized truths of science are generalized and consolidated by Philosophy. Knowledge of the lowest kind is ununified knowledge; Science is partially unified knowledge; Philosophy is completely unified knowledge.” It is the attainment of this completely unified knowledge we should strive for. Are we doing so in following our present course?

Now, while strenuously denying any desire to set up a hobby of my own as a better one to ride than yours, my object this evening is to lead you to think seriously on this question of the value of the facts collected by us, and the use we put them to. If I trample your crops it is only because I cannot walk around them—I must go straight to my object. I *must*

attack—good naturedly I hope you will believe, and with a good motive—the assumed utility of some of the work we of the Cooper Ornithological Club are doing.

We all have at heart, I believe, the welfare of the Club—its growth in strength and usefulness. You will, no doubt, agree with me that to add to its strength we must do work that will interest outsiders—workers, and those who will furnish the sinews of war. To add to its usefulness our work must be of a kind that will give to the science of ornithology facts that will make possible a simpler classification—a classification based upon structure, function and habits. This is what Coues fought for with such uncompromising courage. He fought a good fight. I believe his work will live after him. We shall miss him sadly, but his trenchant words remain to us now that he is gone. He, more than others of our best men, insisted on the weight structure should have in governing classification.

Classifying is knowing, and a knowledge based on facts of a deeper significance than external characters, or on the name of the discoverer of a species, is what we should aim at. Facts of this deeper meaning, gathered by close and *systematic* observation and patiently classified, will be of immense value; first to the science our Club has for its *raison d'être*, next, to kindred sciences and ultimately to the science of Ethics, the science that draws from *all* the sciences, material for those conclusions that are of supreme importance, in that they influence conduct—make it possible for us to formulate rules and determine means for the attainment of the ultimate end—HAPPINESS.

In collecting trayfuls of eggs, drawerfuls of skins, are we doing a work that will be useful in the way I have indicated? I think not. The egg collector—aside from what he learns of the nesting habits of birds (a knowledge, by the way, he might acquire without the robbery) adds nothing to the data that are of value in the proper placing of the bereaved birds in the scale of evolution; and, by the terms of the argument, it is such data we should expend our energies in collecting—data that have a bearing on that point, data with a meaning. To render the collection of such data of any avail, we must bring to bear much patience, much honest labor in getting at the meaning. Every adaptation of the organism to the environment (such as the weak sternum and powerful pelvis of *Geococcyx*, the Roadrunner, or the prolongation of the tibia in *Colymbus*, the Loon—to take marked instances that are most familiar to all of us) every such adaptation is worth studying; worth tracing from its appearance as a bud to its fullest development, or from the beginning of its decadence to its more or less complete atrophy.

What can we learn from a comparison of size, shape and coloration of the eggs? There is, no doubt, a *relation* between the characters of the egg and the bird that laid it; but is that relation one that means anything to us? Does it help us in our search for the solution of the problem before us? The mere gathering of eggs and arranging them in trays to look pretty is not, it seems to me, an object worthy of us. It is too much like the collecting of postage stamps, souvenir spoons, or the flags of the nations.

There is another face to the matter of egg collecting that should not be passed over in silence. Doing as we are doing are we justified in our animadversions upon those who are guilty of promiscuous robbery? (*vide* remarks at a recent meeting upon the course pursued by schools—fostering in children the crime of robbing birds' nests). Is not the difference between our crime and theirs one of *degree* only, not of *kind*? Do the results in our case palliate the wrong?

The careful collection and arrangement of a series of skins—if the homologies and differences are conscientiously studied, and the results of such study put in shape to be of use—is a work that must bear valuable fruit. But I think a rigid system is necessary to justify the hope of any substantial addition to the sum of knowledge.

Division of labor is the prime requisite of this system, for no one man—unless he has unlimited time and money at his disposal—can make a thorough study of more than a species, a genus, possibly a family—at most, an order. If we were a compact organization, working under one roof, nothing interfering with our work along these lines, to one member might be assigned the study of the embryology, to another the anatomical structure, immature and adult, to a third the functions, habits, etc., of a wider range of objects than I have suggested. But these are *not* the conditions under which we are working and *must* work. The existing conditions make it possible to do thorough work only by each member taking up a definite group as his object of study, and making his investigation an exhaustive one—noting and recording the life history of the group selected—not *ab ovo*, but *ab embryo* to the end of the struggle for existence; never losing sight of the pathos of this bitter struggle—never doing aught to make the struggle more bitter; never causing our feathered cousins unnecessary pain; never deliberately taking a life where the benefit to science will not at least balance the evil. If we ignore this detail it is mere pharisaical humbug to prate of the sin of indiscriminate slaughter of birds for millinery purposes.

The exhaustive investigation I urge as a *sine qua non* to a substantial increase of our knowledge calls for more than merely collecting and

classifying skins. Microscopic preparations of embryos, anatomical preparations of young and adult, and carefully made skeletons of both would have to be a part of each collector's study. Do not be afraid that this would be tedious work. Those of you who have never studied under such a system can have no conception of the vastly greater interest there is in the collection of facts that mean something—that call out our powers of analysis and synthesis—than in collecting postage stamps—I beg pardon, I mean eggs. Of microscopy I cannot speak from experience, though I know its extreme value. Obviously the minute modifications of tissue and organ—particularly in the embryo—cannot be studied without the aid of a powerful glass. Such a glass I have never been able to afford; neither have I had the special training required for the successful use of one. Possibly some member of the Club has a high power microscope and knows how to use it. If so, he is the one to take up this branch, doing as thorough work as may be in the group he selects as his special study, supplementing this, if he has the time and opportunity, by doing microscopical work for his brother investigators. Knowing little of the technique of microscopy I am not certain this plan could be successfully carried out, but I believe much material for examination may be preserved for some time, awaiting a chance for placing it under the glass.

As to the fascination of the study of anatomy—the bones, muscles, nerves, vessels, etc.—the organs and their functions—the modifications and adaptations so readily traced after one has learned enough of the general plan to know where to look and what to look for—the fascination of all this I *do* know. I assure you there can be no keener satisfaction to the student of of nature than this close analysis—unless, indeed, he be totally devoid of the analytical habit of mind; in which case he has no place in the army of workers in this field. He had better confine his energies to what will bring some measure of success in spite of loose thinking—if such a thing be possible. For the student of Nature's book, how humble soever may be his role, analysis is the only sure foundation for any superstructure he may attempt to build thereon.

Parenthetically I would say I hope you do not think I myself am so devoid of the analytical faculty as to overlook the fact that, in urging upon you a consideration of the rights of the birds, I am using a two-edged weapon, with which I must infallibly cut my own fingers. You can fairly come back at me, I know, with a "*tu quoque*." If so arraigned I can only say with the poor devil who steals a loaf of bread when starving: "My lords and gentlemen, I am guilty. I throw myself on your mercy. I look for your clem-

ency because—I was hungry." That is my excuse, gentlemen, for the killing, and the encouragement in others of the killing, of my cousins. By this foul wrong I am guilty of, I get the means of being useful to others; those others being of greater value, I believe, in the furtherance of the apparent purpose of evolution—the attainment of a higher, a more complete life. This is my excuse. Can you offer one as good?

But this is a minor matter. My guilt or innocence affects not at all the argument. The avowed object of the C. O. C. is the increase of our knowledge of birds. My contention is that we should try to determine the best means of attaining this object, *and make use of such means*.

ROTH REYNOLDS.

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Book Reviews

BIRD HOMES. The Nests, Eggs and Breeding Habits of the Land Birds Breeding in the Eastern United States; With Hints on the Rearing and Photographing of Young Birds. By A. Radclyffe Dugmore. Illustrated with photographs from nature by the author. Pages xvi—183. Doubleday, Page & Co., New York. \$2 net.

This volume is a combination work of the bird photographer and a key to the land birds of Eastern North America, the latter feature largely predominating. Typographically considered the volume is an artistic success, and the text is well put together, although one can but feel that the ever-interesting subject of bird photography and of "bird homes" too soon gives way to the more or less formal "key" to nests and eggs. While the latter branch of oology has been widely treated by authors for years past, essays on bird photography still possess unusual interest to bird students.

Mr. Dugmore prefaces his work with a strikingly sensible and forcible introduction, in which he appeals to the young bird student to dismiss the idea of a mere egg collection for the more profitable field of research which lies in the study of the birds' habits. He cites his experience with a Yellow-billed Cuckoo's nest containing two eggs which he allowed to hatch. In observing the young the author gained the interesting fact that the feathers do not break through the envelopes gradually as with most birds, but that they remain sheathed until the day before the young leave the nest. Then in twenty-four hours *every* envelope bursts and the bird is completely feathered! Such observations are what the student of to-day should seek, and the author is to be commended for pointing out this line of work to his readers.